

ROOT DISEASE OF 1-0 BAREROOT WESTERN LARCH SEEDLINGS
MONTANA STATE NURSERY, MISSOULA

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August 1986

Nursery Disease Notes No. 40

Seedbeds of 1-0 western larch (Larix occidentalis Nutt.) were recently examined at the Montana State Nursery in Missoula. Seedling density was sparse and many young seedlings had recently died or were very stunted (figure 1). Examination of seedlings with necrotic or chlorotic foliage indicated that their roots were poorly developed and often had extensive epidermal necrosis (easily sloughed off). Several symptomatic seedlings were taken to the laboratory for isolation of associated organisms. Isolations were made onto two selective media: (1) Komada's media for Fusarium (Komada 1975) and (2) V-8 juice agar amended with rose bengal and pimarcine (selective for Pythium spp.).

Of the 30 diseased seedlings from which isolations were made, 28 were extensively colonized with Fusarium oxysporum Schlect. More than half (17 of 30) of the seedlings were also infected with Pythium spp., although individual species of these fungi were not identified.

Although populations of Fusarium and Pythium in the soil were not sampled, they were likely high because of past cropping practices and the lack of soil fumigation. The very low seedbed density may have been largely due to pre- and post-emergence damping-off losses and/or seed decay caused by these pathogenic fungi. The fact that most dead and dying seedlings sampled were extensively colonized by Fusarium and Pythium indicates that these organisms were important in limiting production in larch seedbeds.

Unfortunately, damage from root diseases in bareroot beds is difficult to reduce after sowing. Fungicide drenches are only partially effective (James 1984). The best approaches to controlling root diseases include reducing populations of pathogens in soil and sowing pathogen-free seed. Pathogens in soil can be reduced or eliminated by fumigating soil with methyl bromide/chloropicrin, metam-sodium (Soil-Prep[®]), or the granular dazomet (Basamid[®]). These chemicals are general biocides and generally kill all soil organisms. Therefore, it is important to sow seed that is relatively pathogen-free so that disease-causing organisms are not reintroduced into fumigated soil where they might proliferate in the absence of competing organisms. Although costs of fumigation may be high, seedling density and quality will likely be greatly improved so that a smaller area will be required to grow needed stock. If soil fumigation is conducted, a systematic sampling of soil pathogen populations before and after treatment is recommended to determine efficacy of fumigation.



Figure 1.--Seedbed of 1-0 western larch at the Montana State Nursery, Missoula.
Note the low density and presence of diseased and stunted seedlings.

LITERATURE CITED

- James, R. L. 1984. Evaluation of fungicides to control root diseases at the Champion Timberlands Nursery, Plains, Montana. USDA Forest Service, Northern Region. Rept. 84-9. 19p.
- Komada, H. 1975. Development of a selective medium for quantitative isolation of Fusarium oxysporum from natural soil. Rev. Plant Protec. Res. 8:114-125.